TRAFFIC SPEED REPORT
NO. 74

NOVEMBER, 1961 NO. 28

Highway Research Project

PURDUE UNIVERSITY
LAFAYETTE INDIANA

AND THE STREET, STREET

K. J. THARP
D. F. PETTY

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TRAFFIC SPEED REPORT NO. 74

TO: K. B. Woods, Director November 8, 1961

Joint Highway Research Project

FROM:

H. L. Michael, Associate Director

File: 8-3-3 Project: C-36-10C Joint Highway Research Project

A copy of Traffic Speed Report No. 74 is attached. This report covers the summer, semi-annual speed study of free-flowing rural traffic on state highways in the vicinity of Lafayette, Indiana. These studies have been in progress for over 20 years and provide data on the trend of rural vehicular speeds in Indiana.

This report is similar to the previous ones but also reports two important changes in this long-term trend study. Interstate highways have been added as a separate classification to the study and 2-lane and non-interstate 4-lane highways have been retained as other classifications. Statistical analysis has also been used more extensively in this study and the results include information on the variability of the data as well as the averages previously reported. In this connection, four stations were selected as the most desirable number of locations for each classification. Two stations on noninterstate 4-lane highways were, therefore, also added to the study.

The report is submitted for the record and for release to the Bureau of Public Roads, the Indiana State Police and the Office of Traffic Safety.

Respectfully submitted,

Hauld L. Merful Harold L. Michael

Secretary

HIM: kmc

Attachment

cc: F. L. Ashbaucher

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Progress Report

TRAFFIC SPEED REPORT NO. 74

by

K, J. Tharp and D. F. Petty Research Assistants

Joint Highway Research Project File: 8-3-3 Project: C-36-100

> Purdue University Lafayette, Indiana

November 8, 1961



TRAFFIC SPEED REPORT NO. 74

Introduction

This report is an analysis of spot-speed observations made in June, July, and August 1961. All observations were made of free-moving vehicles on level, tangent sections of rural highways during daylight hours and under favorable weather conditions. Speeds were recorded to the nearest mile per hour.

Because Interstate highways are becoming a vital portion of the highway system in Indiana, they have been added to the scope of the study. Thus, data were collected for three classifications of highway - two lane, four lane and Interstate.

A review of the previous Traffic Speed Reports also formed the basis for a revision of the study. This revision was made to provide for a better statistical analysis of the data collected on the highways. The earlier reports indicated that four stations in each classification would provide a reasonable estimate of average speeds at a moderate cost. To comply with this evidence the stations on four-lane highways were increased to four; four stations were selected on Interstate highways; and the previous four stations on two-lane highways were retained.

The amount of data collected at each station was reduced considerably. The data from the previous studies indicated that 215 observations would allow an estimation of the average passenger car speed within plus or minus one mile per hour at a confidence level of 95%. Similarily, 35 observations of heavy trucks would permit an

estimation of average truck speed within plus or minus two miles per hour at a confidence level of 90%. These minimum sample sizes were adopted for this and future studies and consequently the average speeds recorded at the stations are estimates, with possible error and confidence as noted, of the true average speeds at those locations under the conditions existing at the time of observation.

Locations of Speed Stations

The following speed stations were used in this study.

Interstate Highways

- 1. I-80 0.7 mile east of junction of SR 912
- 2. I-65 1.0 mile north of junction of SR 334
- 3. I-74 1.0 mile east of junction of Post Road
- 4. I-65 2.9 mile north of junction of SR 160

4-Lane Highways

- 5. US 31 1.2 mile south of SR 38
- *6. US 52 1.0 mile south of south junction of SR 28
 - 7. US 41 1.0 mile north of south junction of SR 2
- *8. US 52 1.0 mile north of Klondyke

2-Lane Highways

- *9. US 41 1.0 mile north of Boswell
- *10. US 52 2.0 mile north of Templeton
- *11. US 31 3.0 mile south of Rochester
- *12. SR 25 0.7 mile west of Americus

*indicates stations used in previous studies.

Equipment and Field Procedure

The data for this study were obtained by using an Electromatic Radar Speed Meter. The meter was placed approximately two feet from the edge of the pavement at an angle of less than 10° with the highway centerline. Speed inaccuracies are negligible at small angles, and corrections were unnecessary.

Since the radar equipment will not operate properly if the voltage varies more than plus one volt or minus one-half volt from the optimum twelve volts, the battery voltage was checked periodically and maintained in the proper range. Also, the meter was periodically checked with a 60 mile per hour tuning fork to maintain the correct calibration.

The observers and equipment were concealed from traffic as much as local conditions permitted in order to minimize their effect upon vehicle speed.

Procedure and Analysis

The field data for each station are listed in Tables 1 through 12, inclusive, Tables 13, 14, 15, and 16 are summaries of the interstate, four lane, two lane and all highways, respectively. Figures 1 through 16, inclusive, are cummulative frequency curves computed and drawn from the corresponding tables.

Trucks have been grouped into a "light" (less than 5,000 sounds grant weight or hours' more than 1,000 primes grass weight classification in order to compare observed speeds with legal speeds. Speed limits in the state of Indiana are: 65 miles per hour for passenger cars and light trucks; 55 miles per hour for heavy trucks



on four lane highways with a median width of 20 feet or more, and 50 miles per hour for heavy wruchs on other highways. All four lone highways coserval in this abidy have at locat 20 foot with medians

Passengur cur (att/classifled into three groups - Ind tra, out-of-state, and all passenger cars. Incomplete data, however, were obtained at static three author of its lister: Inc. larger at the available to obtain speeds at this site, only data for passenger cars without classification as to in or out-of-state and trucks were obtained at this site.

Singer of Ranch

The summary of spet-speed observations is recorded in
Table 17. The mean speed of passenger cars appears to have become
nearly stabilized over the past five years. The graphical presentation
(Figure 17) of rural speeds show that the variations obtained by
different studies during this period of time have been minor. The
85th percentile speed also shows a trend towards becoming grable - at
a value slightly below the 65 mile per hour speed limit.

However, since 1954 the mean truck speed appears to be observed increasing (Figure 17). Figure 18 indicate, the same of trend in truck speeds also applies to the 15th percentile, and results in a reduction in the speed differential.

Study of the Interstate highway observations shows speeds which are similar to those obtained on other four-lane highways.

Passenger car speeds at three of the four stations on Interstate highways ("Letion 4, h.d. ac classification of passenger cars) showed with Indiana a decon-Indiana passenger cars transling slightly slower on the Interstate system than those at the stations on the other



Interstate highways (Figures 1, 2, 3, and 4) and resulted in an average speed slightly higher for all of the Interstate Wightay stations.

Comments on Statistical Design of the Speed Study

An analysis of variance (Table 18) for the data collected during this speed study, remain that highers type, station location, we higher significant. This is as a protest. The significant is station location is particularly important because it indicates that the selection of the stational of the observation of ages will have variations in the results obtained.

The estimate of the standard deviation of the location effect is 1.84. The use of four stations in each highway type (as was done) allows an estimate of the true average speed - for that type of highway - within plus or minus 1.8 mile per hour with a confidence level of 17. Let appendixly increase the proclaim of this estimate would require a large increase in the number of stations. This, of course, would result in an excessive cost increase for the study.

It is recommended, therefore, that four stations on each type of highway be continued in future studies. The techniques of securing speed data should be carefully and continuously reviewed by the observers in order to minimize observation effects which could cause a large station to station variance.

The data from this study indicates that the observation of 215 passenger cars projuced the desired projuble error - plus or minus one sile per hour at each station at a 95% confidence level - at cloven of the turbue stations. Thirty heavy truck observations would



have been adequate to attain the desired probable error of plus or minus two miles per hour at a 90% confidence level. At two locations, the number of heavy trucks controlled the survey time period. It is recommended, therefore, that the minimum station sample size for future studies continue to be 215 passenger cars and 35 heavy trucks.



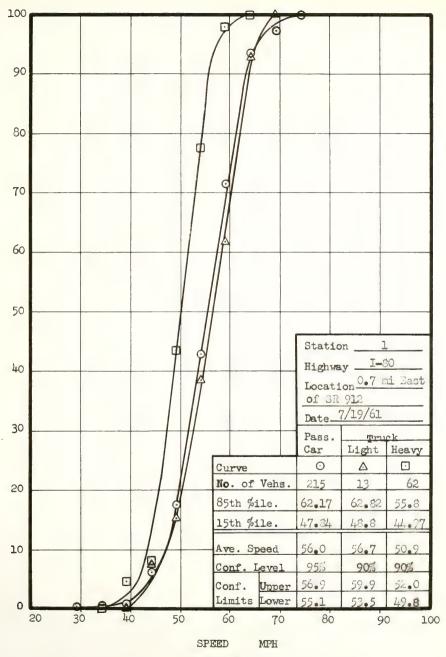


Figure 1



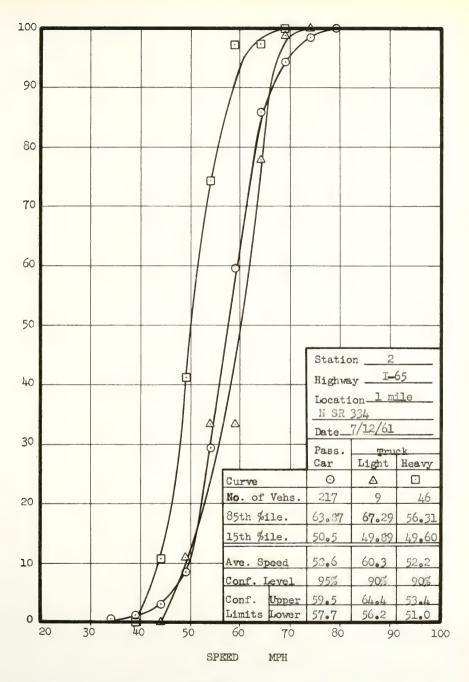


Figure 2



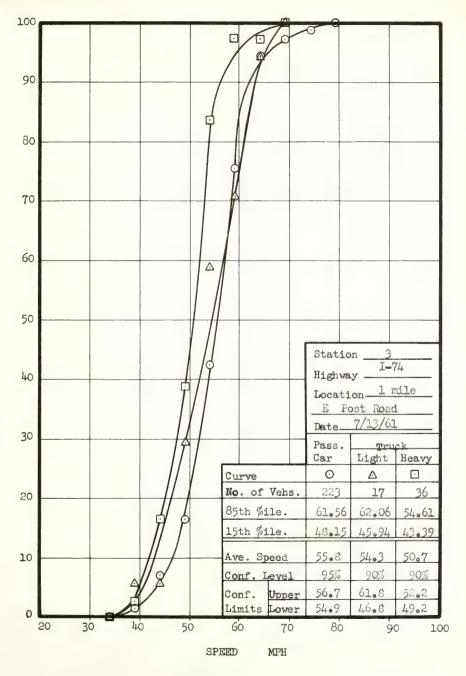


Figure 3



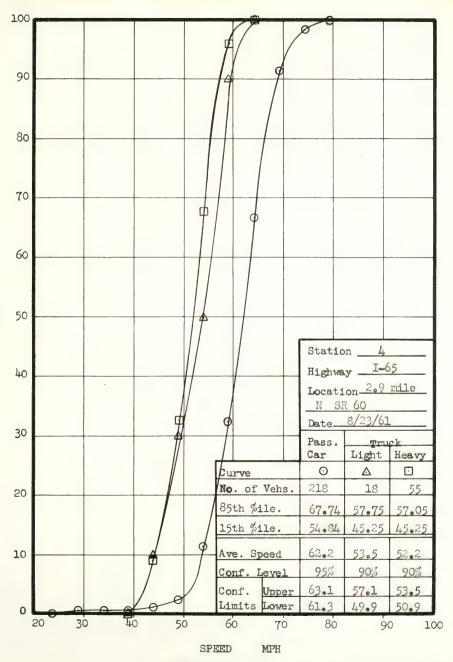


Figure 4



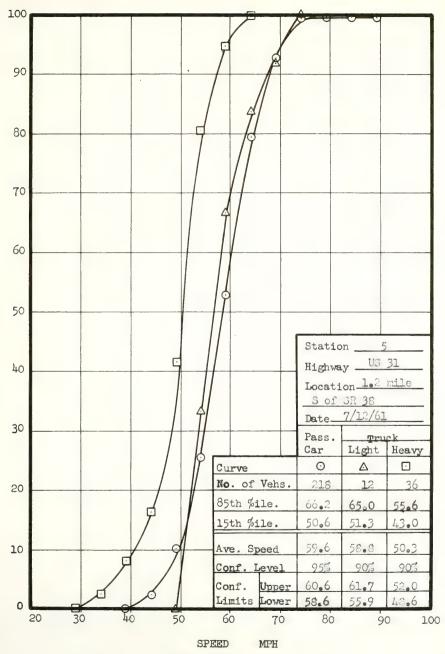


Figure 5



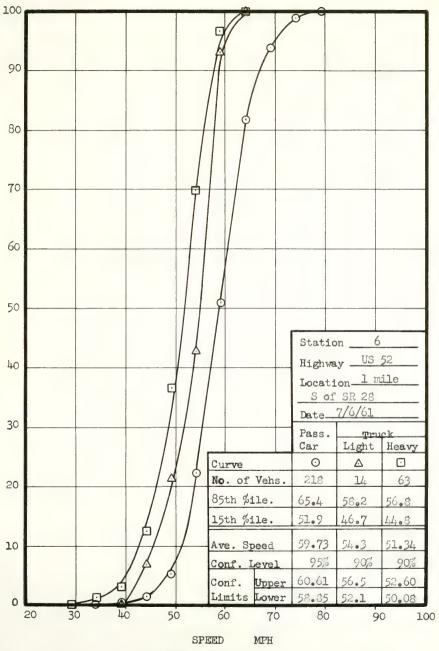


Figure 6



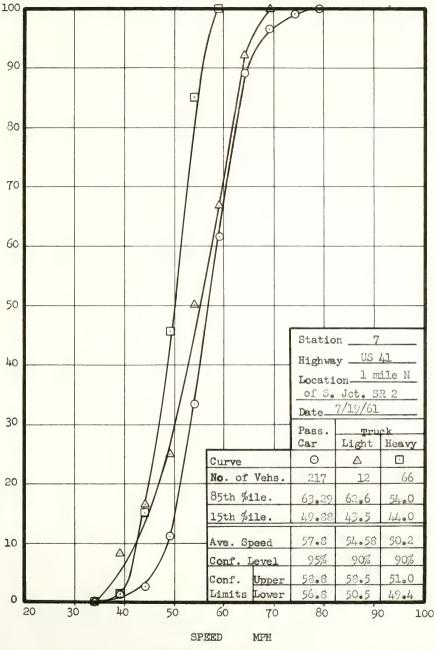


Figure 7



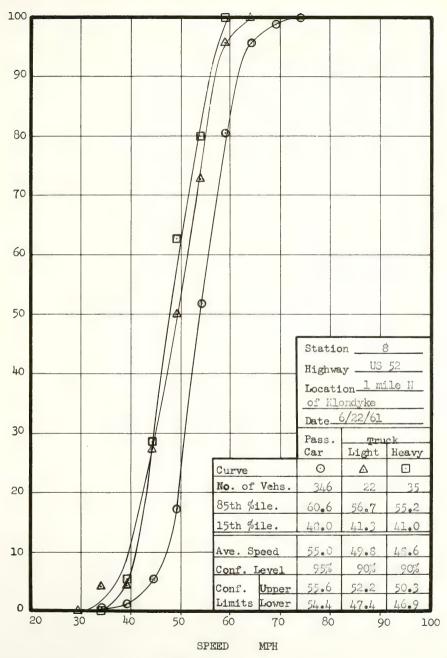


Figure 8





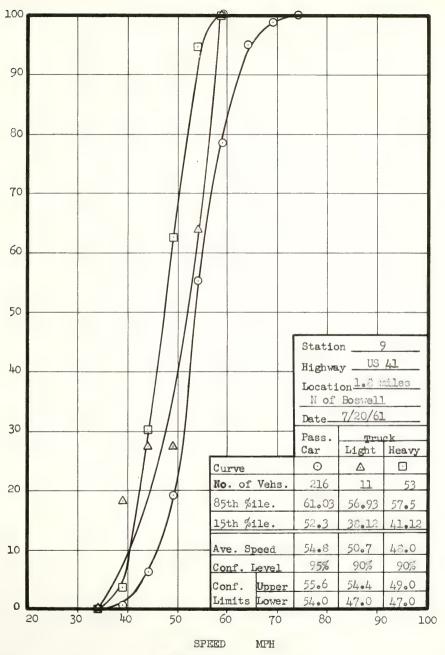


Figure 9



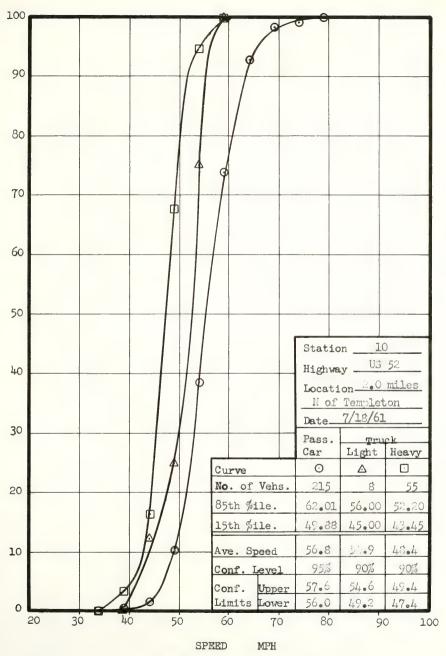


Figure 10



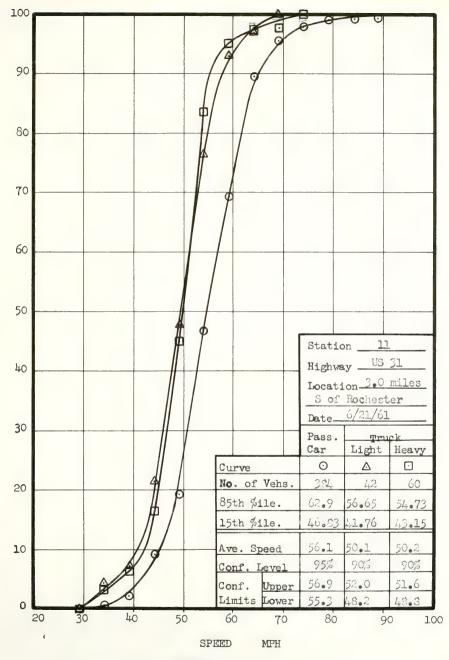


Figure 11



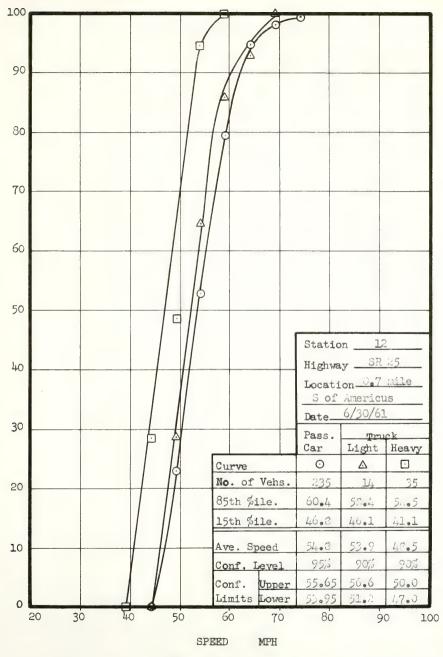


Figure 12



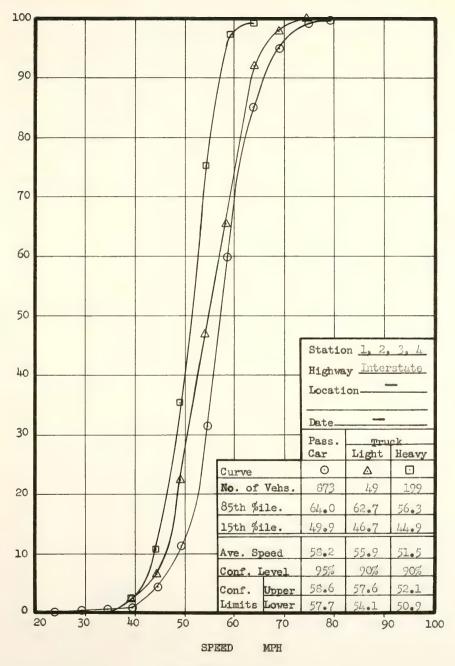


Figure 13



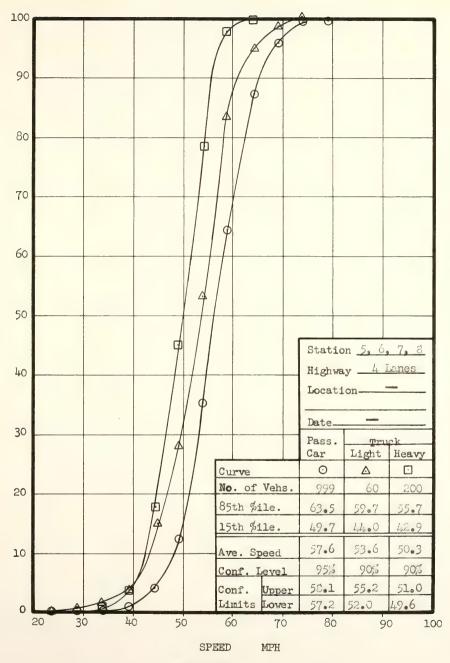


Figure 14



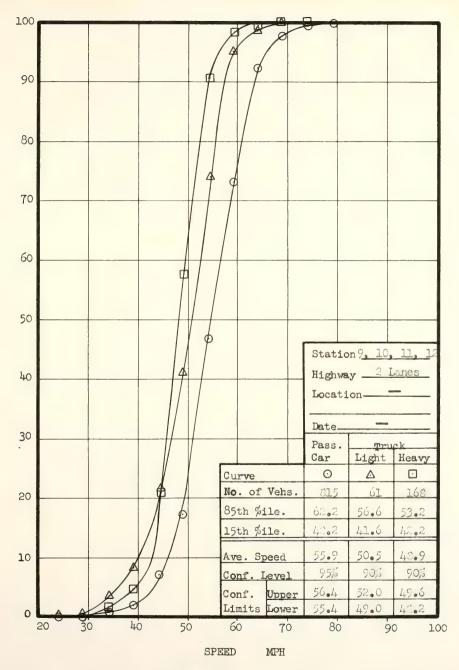


Figure 15



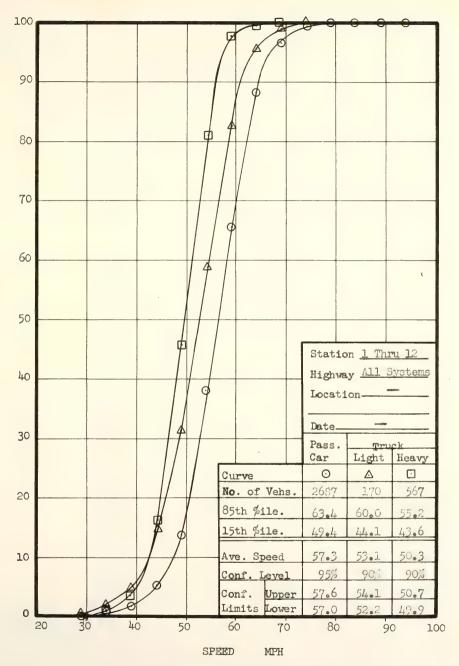


Figure 16



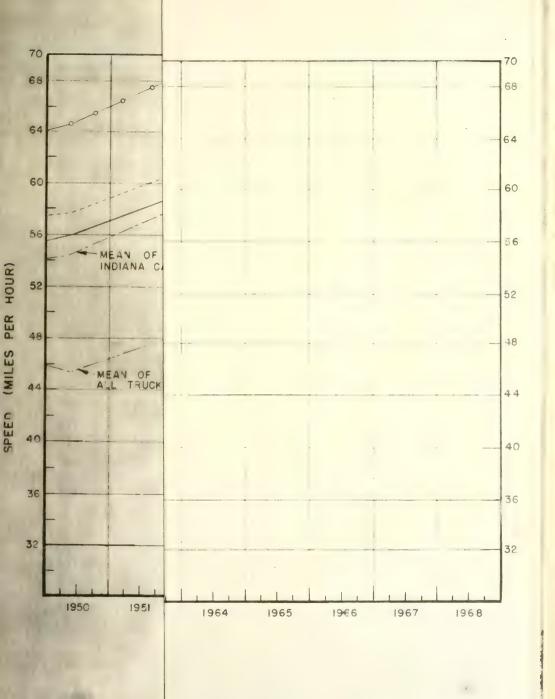
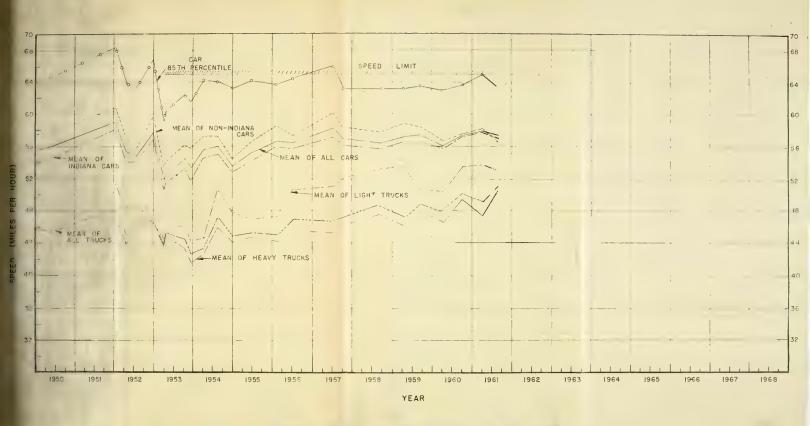


FIG. 17





INDIANA RURAL SPEED TRENDS 1950-1961



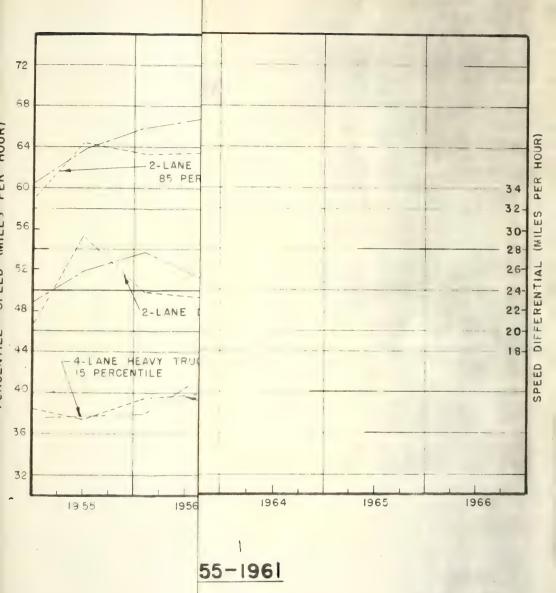
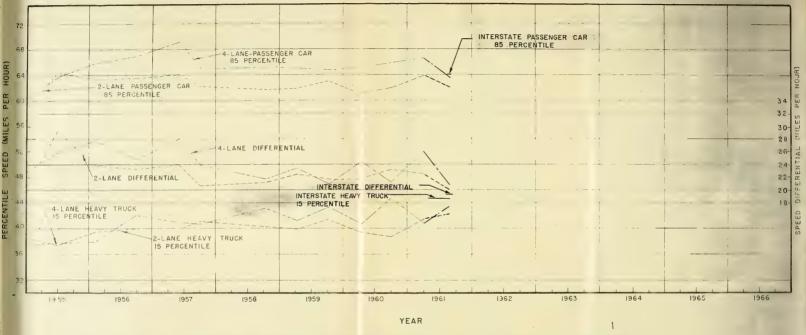


FIG. 18





TRENDS IN PERCENTILE SPEED & SPEED DIFFERENTIAL 1955-1961



SPEED DATA Н TABLE

Location

I-80

 \vdash

Station

0.7 mi east of SR 912

Partly cloudy Present 5000 pounds 50.9 607 43.5 0 9.64 62 ್ಕಿ 770h 00.00 34 or more Last Se o Present Weather Weather (Speed Report Less than 5000 pounds 55.5 56.7 0 7.7 1504 38.5 61,5 100,0 92,3 PRUCKS Last location No previous Present 5.94 51.9 0.4 80 92,0 0.001 1 T F Last Date Present 5604 2.9 100,0 56.3 45 Non-Indiana 104 0 1404 4004 72.1 94.2 98.1 Last Concrete PASSENGER CARS Present 7.97 0.6 10000 54.8 55.7 0 600 1,8 20.7 70.3 91.9 97.3 65 45.1 E Indiana Last July 19, 1961 This Observation Surface 11:15 AM Present 110 105 215 5600 6,97 42.8 55.6 55,1 0.5 0.9 6,1 17.7 7102 93.0 7.26 0.00 in th F Last Highway Date Time Average speed (m.p.h. No. of vehicles obs. of vehicles obs. No. of vehicles obs. Standard deviation m.p.h. 24 m.p.h. 74 m.p.h. 79 m.p.h. 89 mep.h. OBSERVATION 29 m.p.h. 34 m.p.h. m.p.h. m.p.h. 69 m.p.h. 84 m.p.h. 39 m.p.h. 44 m.p.h. 49 m.p.h. Average speed Average speed 左 29 No. of Lanes rpsn Ţeaa • oz traveling % of vehicles Boun pumog All vehicles



TABLE 2 SPEED DATA

Clear			5000 pounds or more	Last Present	977	52,2	14.077	0	0	0	0	10,9	41.1	711.00	97.3	97.8	10000		•	- Control of the Cont		20	200€	26	55.53
Weather	Last Previous Observation (Speed Report No. Date No. Three Location	TRUCKS	Less than 5000 pounds	Present	6	60.27	7.55	0	0	0	0	0	11.01	33.3	33.3	777.7	ಕ್ಕು	100,0	*		-				
	Spee		502	Last																					
1 mile II SR 234	ervation No previous		All	Present	55	53.50	6.23	0	0	0	0	9.1	23.6	67.2	87.1	94.5	00006	100,00	-	1	Company and			-	1
116	ous Obs Date Time			Last																					
	t Previou Da Ti		diana	Present	4.3	57.62	6.24	0	0	0	0	2,3	7.0	37.2	65.0	93.0	97.6	9.26	100.0	-	-	20	57.0	23	50,2
Location	Las		Non-Indiana	Last																					
3 00d		PASSENGER CARS	Indiana	Present	174	50.63	701.2	0	0	9°0	7.7	3.4	9.2	24.6	53.6	63.9	93.1	95,1	100,001	2	-	දරු	58,1	356	59.3
	1961 1961 145 AI.	PASSEN	Indi	Last																					
1-65	Observation Surrace Date July 12, 196 Time 9:15 - 9:45		LIA	Present	217	58.6	6,65	0	0	0.5	1.04	3.2	භ	29.5	59.5	85.7	0.4/6	90,00	100.0	1		108	57.9	109	59.0
ay m	A LEGIC			Last																					
7	This			OESERVATION	No. of vehicles obs.	Average speed (m.p.h.	Standard deviation	24 m.p.h.	29 m.p.h.	34 m.p.h.			49 m.p.h.	54 m.p.h.	59 m.p.h.		69 m.p.h.	74 m.p.h.	79 m.p.h.	84 m.p.h.	89 m.p.h.	of vehicles Obs.	Average speed	No. of vehicles obs.	age speed
Station	No. Of Lanes			O	No.	Aver	Stan			Зu		ont Table	17 17	988	ror	idə idə	v j Je	ro s	8			No.	Aver	No	Average
tat	ò										S	этс	ţų	ΛG	TT	7					1	un	Bo	pur	nog



TABLE 3 SPEED DATA

Highway Observay Date Time	Highway I-74 Observation Surface Date July 13, 1961 Time 3:30 - 4:15 FM	e e 1961 15 FM PASSENGER CARS	L L	Location PCC Last	t Previo	ous Obse	10n 1 mile E of Post Road CC Weather Last Previous Observation (Speed Report Date No previous study at thi Time location	We We Speed	Weather Westher Study at this TRICKS	Cloudy No.	
4		Indiana	na	Non-Indiana	diana		All	Les 5000	Less than 5000 pounds	5000	5000 pounds
Last Present	ant	Last P	Present	Last	Present	Last	Present	Last	Present	Las	Present
223			188		35		53		17		36
55.8			55.4		57.6		51,3		54.2		50.7
6.83			6.75		5.59		6,36		7.48		5.60
0			0		0		0		0		0
0			0		0		0		0		0
0			0		0		0		0		0
€0° H			1.6		2.9		to		5.9		2.8
7.2			7.4		5.7		13.2		5.9		16.7
16.6			18.1		3.6		35.3		29.4		35.9
42.2			43.6		34.3		75.5		53,3		83.3
75.3			78.2		0009		\$5.7		70.6		97.2
94.2			70.76		91.4		96,2		91.01		97.2
97.8			97.9		97.1		100,0		100.0		0001
1966			5.66		97.1				-		-
100.0		-	100.0		100.0		1		-		-
-									-		-
- Careers					-		-		disease etc.		-
120			100		20		-				16
52.37	T		54.75		50.50		-		1		50.0
103			83		15		-		1		20
56.28	40		56.25		56.30		-		-		51,25



TABLE 4 SPEED DATA

war																								Г
cloudy, warm		5000 pounds or more	Present	55	52,2	5,06	-	440.000	***************************************	0	60.6	32.73	67.27	96,36	100,00		-			1	23	50,1	32	
Pertially No.		5000	Last																					
Weather Page Report N	TRUCKS	Less than 5000 pounds	Present	10	53.5	5,83			1	0	10.0	30.0	50.0	90.0	100.0					1	9	54.02	77	
West Students Students	L	Less 5000	Last																					
Last Previous Observation (Speed Report No. Date No previous study at this Time Location		All	Present	65	52.4	5,26				0	9.2	32.3	9*179	95.4	100,0	Columnia trapp	-	-			29	50.9	36	
ous Obs			Last																					
2		Non-Indiana	Present						694 Ma-014	-	-	-	-	description and	date one can		-						-	
Last		Non-Ir	Last																					
PC	PASSENGER CARS	Indiana	Present	1	ı		-			1	-		-	000000			1	-	-				1	
e 1961	PASSE	Ind	Last																					
gr Surface August 23, 196 2:30 - 4:20 PM		LLA	Present	218	62,2	6.64	0	94.0	0.40	94.0	1,38	2,75	11.47	34.57	66,51	91,28	98,20	100,0	-	-	110	62,0	108	
TVario			Last																					
unes 4/4 Observation Surface Inis Observation Surface August 23, Time 2:30 - 4:2			OBSERVATION	No. of vehicles obs.	Average speed (m.p.h.	Standard deviation	24 m.p.h.	29 m.p.h.	34 m.p.h.	_	44 mepeho	49 m.p.h.		59 т.р.h.	64 m.p.h.	69 m.p.h.	74 m.p.h.	79 m.p.h.	84 m.p.h.	89 m.p.h.	of vehicles obs.	Average speed	No. of vehicles obs.	
No. of Lanes			0	No.	Aver	Star			20	ιř[ıı	SE8	[c]	ep	v 1	ro ș	8			No.			-
No.	L									S	9[[, çų	θV	ננו	1						um		pu	



TABLE 5 SPEED DATA



TABLE 6 SPEED DATA

Highway US 52 Observation Surface Date July 6, 1951 Time 3 - 4 PM	St Sur July 3 - 4	US FM FM	52 se 1951 I	951 Bitu	Mino	Previo	ous Obse	lon 1 mile 5 of SR 28 us Last Previous Observation (S Date larch 17, Time 2 - 3:40 PH;		ا اقا بد	Clear No.	& sumy
		All	Indi	Indiana	Non-Ir	Non-Indiana		A11	5000	Less than 000 pounds	5000	pounds more
	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
	521	218	339	138	182	30	116	77	19	ה	26	63
09	4009	59.75	59.7	60°4	61.3	50.7	48.1	51,35	59.5	54.3	45.9	51,03
ě		6,63		7.34.	1	1.01		00009		5.06		6.1
- 1				-	-			-		-		
	1				-	-		00,000,000				diament of
- 1	1			-	1	•	1	1.3	ł	-	-	1.6
i	1	0.5	1	0.7			1	, ó	-	-		3.2
1		1.8	-	2.9			35.3	14.3	5.3	7.1	1.1.2	12.7
5.4	7	5.5	6.5	7.7	5,5	1.3	56.0	33.8	10,5	21.4	6,79	36.5
17.1		22.4	20.0	21,0	11.5	25.0	85.3	6,79	31.6	42.8	6.56	8,69
38.6	9	50.9	43.1	43.5	30°5	63.7	92.2	96.1	52.6	92.9	100.0	6.96
75.2	N	31.5	79.1	77.5	62,1	38.7	9.95	100.0	73.9	100.0		100,0
93	5	93.6	7.49	91.4	91.2	97.5	99.1	-	94.7	-		
0.66	0	5.36	2.66	97.3	97.3	100.0	100.0		100.0			-
- 1		100,00		100,00		-		all the said		-		-
_1		dip ere co	97 000	-		1	-		1	-		dia ma dep
'	-	day Consider	-	-	-	-	98 ma (10)		-		-	- Carterina de la carte de la
14	273	106	174	73	66	33	52	52	12	to	077	1/1/1
0	62.3	61,1	61.3	61.9	0.79	59.3	50.5	53.3	59.0	51.9	740.0	53.6
	248	112	165	65	83	47	79	25	7	9	57	19
10	53.4	58,5	57.9	52.6	59.3	58,2	46.2	45.9	47.09	57.5	44.5	1,6,1



TABLE 7 SPEED DATA

Station /		Way	Of Surface	-1 a	PCC	Location	1	N OT		of SR We	Weather	Cloudy	qa
This	Obsert Date Time	rvati e e	Observation Durante Date July 19, 1961 Time 1:20 FK	1961		[E]	st Frevio D	ous Obs Date Time	Last Previous Observation (S Date No previous Time Location	(Speed	43	. 1	Î
				PASSE	PASSENGER CARS	,,					TRUCKS		
			All	Ind	Indiana	Non-L	Non-Indiana		A11	Les	Less than 5000 pounds	5000	5000 pounds or more
OBSERVATION		Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
No. of vehicles obs.			217		102		115		73		12		99
Average speed (m.p.h.			57.8		50.1		57.5		50,3		9,49		50.2
Standard deviation			7.67		7.25		6.29		5.75		8,53		4.2
24 m.p.h.					-						***		Augustio-page
29 m.p.h.							-		-		-		-
34 m.p.h.			1				-		-		******		-
39 m.p.h.	_		1.04		2.0		6.0		2.6		S ₂ 3		1.5
44 mepeho			ري دي		6.7		600		150/		16.7		15,2
49 mepehe	_		T.		10.0		11.3		143		0.53		45.5
54 m.p.h.			32.2		22.4		33.9		79.5		60.0		24.8
59 m.p.h.			61.3		56.9		65.2		6.76		66.7		100.0
64 m.p.h.			35.9		36.3		91.3		2.00		2.16		-
69 m.p.h.			96.3		95.1		97.4		100.0		100,0		District Control
74 m.p.h.			5.66		100.0		69.1		th series		disting ass		And the same of
79 mepeho			100.0		-		100.0		Angle com Mag				Chross dep
84 m.p.h.			discovered to the same of the						to make		******		
89 m.p.h.					00 00-00						-		das dissens
of vehicles obs.			106		50		56						30
Average speed	- 1		53.2		59,3		57.1						50.0
No. of vehicles obs.	T		111		52		55		-		-		36
Average speed			57.04		76.9		57.3		Cotep maps dated				5003
	í												



TABLE SPEED DATA

Sta	Station	8 Highway	way	US	52		Location		ile N	mile N of Klondyke	ke	:		
No.	No. of Lanes	This	TVETTO	Observation Surface Date June 22, 19	1961	PCC		Last Previous Observation Date April 4. Time 3 - 10:20	ous Obse		Speed 961	Speed Report No. 1961	No.	- swmy
					PASSE	PASSENGER CARS						TRUCKS		
				ALL LIA	Ind:	Indiana	Non-Indiana	diana		All	Less	Less than 5000 pounds	5000	5000 pounds or more
	0	OESERVATION	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
	No.	No. of vehicles obs.	532	346	356	260	176	36	170	57	67	22	121	35
	Aver	Average speed (m.p.h.	53.9	55.0	55.2	54.7	60,2	55.8	49.4	49.1	51.9	19.8	4004	43.6
	Stan	Standard deviation		5.93		6.44	-	5.60		6,18	-	6.83	-	6.21
		24 m.p.h.	-	-	-				-	an opens	-		-	
		29 m.p.h.	-	-	1	-	-							*******
	Зu	34 m.p.h.	-	0.3		47.0				භ ස්	-	9017		
8	ijŢ	$\overline{}$	-	1.5	-	1.5	-	-		5.3	-	4.6		5.7
т		44 mepsho		5.00	-	5.3		J.5	25.9	27.1	26.5	27.03	25.6	23.6
ŢŲ	H	49 m.p.h.	රා ජා	17.3	11.3	19.3	€°	11.6	1.7.6	57.9	1,5.0	50.0	4.08°	62.9
AV.	89. 889.	54 m.p.h.	the the	51.7	는 - 22	55.9	17.5	Lessol	77.6	77.2	65.3	72.7	32.6	30.0
LLV	icl	59 ш.р.h.	49.3	30.45	52.0	0.03	6.7.0	31.1	93.5	0	3.1.	95.5	93.3	100,0
	цә.	64 m.p.h.	9.00	95,1	51.7	4.066	7.01.	91.0%	0.03	100.0	100,0	100.0	100°C	mente
	v l	69 m.p.h.	4.66	93.3	97.01	47.00	90	93.3	-	Care Care Care		-		-
	0 9	74 m.p.h.	56.1	130.0	53.3	100,0	57.7	100,0	1	-	1			40 mm can
	6	79 m.p.h.				-	1		ì	-	-		4	-
		84 mepehe	-		-	-	-	-	1	-	-	CASP-PARK CHIS-		and one day
-		89 m.p.h.		Oppose day		***************************************	-			-	-	and the same		-
num M	No.	of vehicles obs.	275	171	172	155	103	33	99	25	25		1,1	174
	Aver	Average speed	57.0	74.3	50°J	54.07	52.1	55.04	47.9	47.5	50.6	43,0	46.2	47.1
pun		No. of vehicles obs.	257	175	184	12.7	73	27	101	5%	22,	H	0-C	11
Bou		Average speed	61.0	55.1	ر ا ا	She C	. ° ()	50.0	70	J.0.3	50,03	71.0	10.0	12, 011



TABLE 9 SPEED DATA

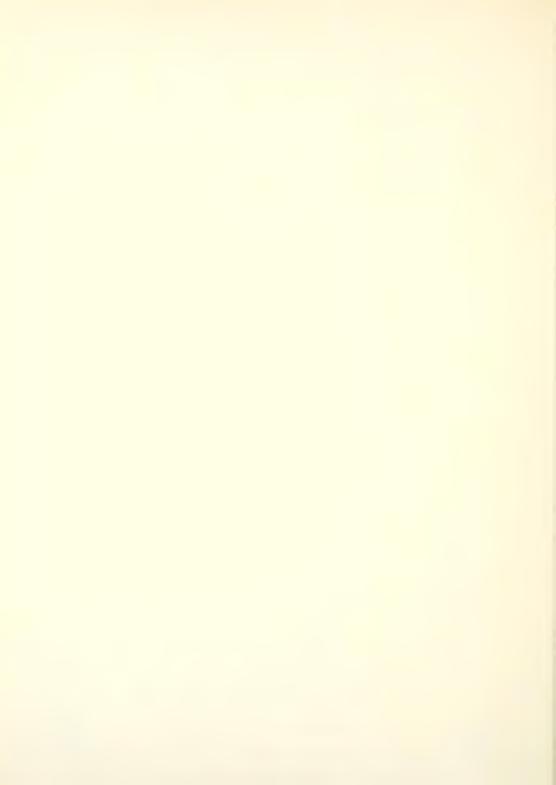


TABLE 10 SPEED DATA

- Clear	٠	spunod	Present	55	48•4	4,38	0	0	0	3.6	1604	67.3	94.05	100.0			1		Carlo de Carlo		26	49.0	29	47,08
Cloudy No. 72		5000 or	Last	36	73.0	-					33.3	40:74	\$6.1	100.0			1		-		13	45.5	23	1,904
	TRUCKS	Less than	Present	භ	51.9	4.58	0	0	0	0	12.5	25.0	75.0	100,0	1	-		-	-	- Comments	4	53,8	4	50.0
Weat Speed R	I	coos	Last	OT	51.3	-	The same of the		1	-	20.0	0.04	10000	0.06	100,0	1	1	distance and	-	-	3	49.3	7	52.1
inous Last Previous Observation (Speed Report Date Last) 1961 Time L2:15 - 1:30 PM		A11	Present	63	6°54	4.46	0	0	0	3.2	15.9	61.9	92.1	100.0	-	-		-	-		30	1.9.7	23	4.01
O miles ous Obse Date		1	Last	947	43.7	-			-		30.4	43.5	30.4	97.5	100.0			- Contraction	-	-	16	46.3	30	50.1
us t Previo		diana	Present	118	56.4	5.19	0	0	0	0.9	1.7	3.5	38.1	77.1	95.3	100.0	-		-	-	75	56.5	43	56.1
Location Eituminous Last		Non-Indiana	Last	215	56.6	-				***************************************		භ භ	38.1	61.9	93.0	99.1	100,0	-			91	57.6	124	55.3
I E	PASSENGER CARS	Indiana	Present	26	57.04	6.43	0	0	0	0	2.1	12.4	35.1	69.1	88.7	6.96	0.66	100.0		-	56	59.0	41	55.2
US 52 Face 1961	PASSE	Ind	Last	1740	56.3	-					-	12.1	55.0	65.6	92.9	99.3	99.3	1		-	63	57.2	57	94.09
Highway US 5 Observation Surface Date July 18, 15		דדע	Present	215	56.8	6.1	0	0	0	0.5	1.9	10,2	38.5	73.5	92.6	93.6	99.5	10000	disease		131	57.6	178	55.0
Tree of		1	Last	355	56.5		-	1				1001	36.9	62.3	92.9	99.2	7.66				174	57.4	181	55.5
anes This			OBSERVATION	No. of vehicles obs.	Average speed (m.p.h.)	Standard deviation	24 m.p.h.	29 m.p.h.			Ter.	the the mephe	o o 54 m.p.h.	T	oh o 64 mepehe	4 69 m.p.h.	74 mep.h.	79 m.p.h.	84 m.p.h.	89 mepehe	No. of vehicles obs.	Average speed	No. of vehicles obs.	Average speed
Station										S	əŢ	ŢŲ	ΑA	TT	7					1	um		pur	nog



TABLE 11 SPEED DATA

Sunny Present 5000 pounds 45.0 6000 16.7 or more 0 0 No. 72 Clear 52.6 7.46 46.3 Last 31.5 57.57 100.0 Present (Speed Report Less than 5000 pounds 92.8 97.5 9.67 76.2 50.5 PRUCKS 0 0 3.0 miles S of Rochester 54.6 55.6 Last 0.7 52,0 0000 92,0 53.3 28.0 -5:35 Last Previous Observation Present 1 26.9 0.46 93.0 13.6 1,601 7°08 100,0 50°4 50,0 April 6.9 -3:15 0 0 급 76.3 97.5 49.3 6.57 Last 4501 24.1 52 Date Present 52.0 60,0 92.0 93.0 55.2 56.7 52 100.0 Non-Indiana 0 0 0 Location 25.0 95.6 55.3 Last 57.4 98.5 63 406 28 asphalt PE PASSENGER CARS Present 3.8 55.3 56.1 11,2 20.7 45.2 69.1 88.5 0.46 97.3 1.1 1:00 0 0 Indiana Last 37.6 62.0 87.3 97.8 56.8 57.1 12,2 94.1 Alki This Observation Surface 10:40-12:00 US Present 56.0 0,3 40.8 0.69 89.5 4.56 3.66 50.4 55.6 204 19.3 180 387 7.6 0 0 June Ā 50.7 Last 35.1 භ දර දර දර 94.6 57.5 61.1 138 159 Highway Time Date Average speed (m.p.h. ops. No. of vehicles obs. No. of vehicles obs. Standard deviation of vehicles m.p.h. 24 m.p.h. 29 m.p.h. m.p.h. m.p.h. m.p.h. m.p.h. 64 m.p.h. 69 m.p.h. 74 m.p.h. m.p.h. m.p.h. m.p.h. OBSERVATION m.p.h. Average speed Average speed H 59 8 64 62 8 No. of Lanes J.S Teaa JO than No Station traveling % of vehicles punog All vehicles



TABLE 12 SPEED DATA

St	Station	12 Highway	æy	SR 25	25	1	Location		/ mile	0.7 mile S of Americus	icus			
No	No. of Lanes	This	TYPE	Observation Surface Date June 30, 1	e 1961	Bit	Bituminous Las	t Previo	ous Obs	Last Previous Observation (Date Date	Speed 1961	Speed Report N	No. 72	1
		Time	(1)	1:40 - 3	PK		1	H	Time	10 AM - 12:45 PW	12:45	PM		
					PASSE	PASSENGER CARS						TRUCKS		
L				LLA	Indi	Indiana	Non-Ir	Non-Indiana		ונא	Less 5000	Less than	5000 or	5000 pounds
)	OESERVATION	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present	Last	Present
	No.	No. of vehicles obs.	366	235	340	200	26	35	135	64	142	14	93	35
	Ave	Average speed (m.p.h.)	57.0	54.8	6.95	54.7	57.5	55.4	50.2	50.0	54.8	53.9	45.1	40.5
	Star	Standard deviation	-	0909				-	-	-		6,08		5.45
		24 m.p.h.	-			-	-	-		-	-	020 000 mp		
		29 m.p.h.	-		-					Ba a	-	1		dip-str-dip
	30	34 m.p.h.		1	-	-			1	-	1		-	-
	ıί[-	and department	-	-	-	-	-	-		-	-	Openings only
- [(7AG	_	-	the State Con-	-				21.5	20.4	D3	day there is n	24.07	28.5
TH		5 49 m.p.h.	16.7	23.0	17.1	24.05	11.5	17.03	1,0.7	42.8	26.92	2 % 6	55.9	40.5
Jul.	Sə	54 п.р.н.	38.3	52.7	33.2	50.3	33.5	51.4	~1.	0.	61.9	64,03	90.3	94.2
	Lol	- 59 m.p.h.	62.3	79.2	62.6	79.5	57.7	77.1	9.3	95.3	76	35.5	100.0	100,00
	ep	_	80.9	4.46	81.2	92.0	76.9	97.1	50.5	97.9	50	72.3		daypa
	v l	69 m.p.h.	9.76	98.2	92.6	0.06	92.03	100.0	50.00	100.0	9502	105.0	-	-
	ro s	74 m.p.h.	97.3	99.5	97.4	99.5	96.4		90.		25.0	Distriction desired		-
	8	79 m.p.h.			-	97					-	elle une gan	dig the me	dell' sono esso
		84 mepehe	8 2		1	-	-	-	-		-	40 dip 40	Man app age	-
		89 m.p.h.			-	-	-	-			-		-	-
um	No	of vehicles obs.	179	111	168	92	11	19	72	777	5.5	5	147	17
I	_	Average speed	57.3	55.6	57.5	55.5	61.5	56.2	50.0	50.0	5504,	54.00	0.37	4.07
		No. of vehicles obs.	187	124	172	307	15	16	63	127	17	6	1,6	18
S	Ave	Average speed	56.2	7/: 1	56.14	0.42	54.05	51.05	1.5.7	50.1	5000	55.2	1,00	1, 3, 3



TABLE 13 SPEED DATA

Present 5.27 5000 pounds 24.8 35.6 10.6 47.26 100,0 or more Last Last Previous Observation (Speed Report No. Date No Drevious study Last Present Less than 5000 pounds 0.74 98.0 100,0 PRUCKS See individual stations Last Present 00.9 33.0 0.001 52.04 7.69 9101 94.6 0 F Date Time Present 6.41 000 56.9 38.4 67.6 98.9 11.5 Non-Indiana 182 93.4 Location Last PASSENGER CARS Last Present 56.7 15.4 38.0 69.1 0006 0,96 99.2 0000 7°0 0 Indiana This Observation Surface Present 98.3 26€ 100,0 1104 31.5 0.1 0.3 4 Last Station 1, 2, 3, 4 Highway Date Time Average speed (m.p.h. of vehicles obs. No. of vehicles obs. No. of vehicles obs. Standard deviation 59 ш.р.h. 79 m.p.h. 84 m.p.h. 89 m.p.h. OBSERVATION 49 m.p.h. m.p.h. 64 m.p.h. 69 m.p.h. 74 m.p.h. 24 m.p.h. 29 m.p.h. 34 m.p.h. mep.h. mepeho Average speed Average speed 太 No. of Lanes No. traveling % of vehicles All vehicles Boun pumog



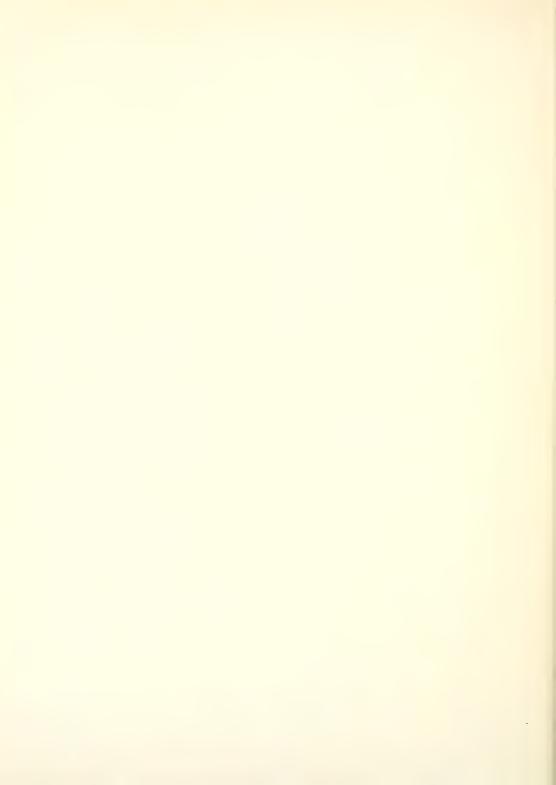
TABLE 14 SPEED DATA

Last Present 5000 pounds 13.0 45.0 7.0 78.5 0.5% 200 0.7 or more Last Previous Observation (Speed Report No. Last | Present 5000 pounds 7.61 Less than PRUCKS 1.7 15.0 23.3 10000 -See individual stations Present 6.39 93.8 260 51,0 160°0 1.2 17.3 41.2 72.7 5.76 0066 A. Last Date Time Last Present 6.15 9.66 Non-Indiana 1.3 33,3 9.99 0006 9.96 1000 3.15 Location PASSENGER CARS Present 70.54 57.6 36.3 0.66 96.6 999 13.5 62.3 36.0 95.3 9.66 0,2 1.2 405 Indiana Last 4 Lanes This Observation Surface Present 7.13 99.3 57.6 0,1 0.9 35.6 99.2 99.3 300 -F Last Station 5, 6, 7, 8 Highway Date Time Average speed (m.p.h. No. of vehicles obs. No. of vehicles obs. Standard deviation of vehicles 84 m.p.h. OBSERVATION 24 m.p.h. 29 mep.h. 34 m.p.h. 44 m.p.h. 49 m.p.h. 54 m.p.h. 59 m.p.h. m.p.h. 69 m.p.h. 74 m.p.h. 79 m.p.h. 89 mep.h. 39 m.p.h. Average speed Average speed No. of Lanes than Ţesa J.E JO No. traveling % of vehicles pumog All vehicles



TABLE 15 SPEED DATA

		pounds	Present	168	43.9	5.52		0.0	1.2	4.8	20.8	57.7	90.5	95,2	47.66	4.66	100.0		Comments		-		- Deline		
:		5000	Last																						
Report N	TRUCKS	s than	Present	61	50.4	7.10	-	0,0	3.2	8,2	21.3	41.0	73.8	95.0	93.4	100.0				-		-			
We Need Speed		Les 5000	Last																						
ervation No previ		411	Present	229	49.3	6.05		0.0	1.7	5.6	21.0	53.2	36.0	97.04	99.1	9%66	100,0	-	Collection care	-	-	-	1		
ate			Last																						
st Previou		diana	Present	335	55.6	5.33	-		0.0	0.0	3.0	14.0	43.6	76.7	95.2	2.66	100,00			-	-		-		
Las		Non-L	Last																						
		iana	Present	7,80	56.2	5.17	-	0.0	0.0	1.3	3.5	19.0	6440	69.3	40.68	95.4	90.1	9.66	90.66	93.6	-	0	-	1	
0)	PASSENGE	PASSE	Ind	Last																					
of Surface		LIA	Present	\$15	55.9	7.33		0.0	0.04	1.4	9.9	16.9	46.64	72.6	91.3	97.2	90.8	8.66	99.8	5.66		ı	-		
Type			Last																						
This			OBSERVATION	. of vehicles obs.	erage speed (m.p.h.	andard deviation	24 m.p.h.	29 m.p.h.			uei	€ 49 m.p.h.	9 54 m.p.h.	7 59 m.p.h.	6 64 m.p.h.	4 69 m.p.h.	74 m.p.h.		84 m.p.h.	89 m.p.h.	0	erage speed	of vehicles obs.	Average speed	
10. of				용	Av	St			āu						_	A J	ro ;	8		1				Bou	
	No. of Lanes This Observation Surface Last Previous Observation (Speed Report No.) Date Date Time Time	This Observation Surface Date Time PASSENGER CARS	This Observation Surface Date Time PASSENGER CARS All Indiana Non	This Observation (Speed Report No. Date No previous 5tudy Date No previous 5tudy Date No. Date No previous 5tudy	This Observation (Speed Report No. Date No previous 5tudy Passenger Cars Passenger Cars Passenger Cars	This Observation (Speed Report No. Date No previous observation (Speed Report No. Date No previous study	This Observation Speed Report No. Date Date Mo previous study Date Date Mo previous study Date Date Mo previous study Date Date	This Observation Speed Report No. Date Last Previous Observation Speed Report No. Date Last Present Last Pre	This Observation Speed Report No. Date Last Previous Observation Speed Report No. Date No. Date	This Observation Speed Report No. Date Last Previous Observation Speed Report No. Date Non-Indiana All Indiana Non-Indiana All Instantant All Indiana Non-Indiana All Instantant <	This Observation Surface Last Previous Observation Speed Report No. Date No. D	This Observation Surface Last Previous Observation Speed Report No. Date No previous study Time Time	This Observation Surface Last Previous Observation Speed Report No- Date Date Date Date Robert Report No- Time Time Time Time Time Time Robert Report No- Time Tim	This Observation Pate Last Previous Observation Speed Report No. Date Lost Previous study Passender CARS Time Time	This Obser-Advisor of Startface Instance Last Previous Observation (Speed Report No. Date No previous study and provided (m.p.p.h. 182) Take Instance of All Instance	This Obser-Methon Last Previous Observation Speed Report No. Date Institute Institute	This Obser Welford Surface Last Previous Observation Speed Report No. Last Previous Study Last Present Last Last Last Present Last Last	Paris Observicing Further Project Observicing Speed Report Observicing Observicing	Pate Pate	Title Date Date Mostled Surface Date Mostled Most	Tile Disear Application Disearch D	Paris Pari	Particular Par	PASSENGER CAPS Pate Pate	



SPEED DATA 16 TABLE

All Systems

See individual stations

Present 5.67 5000 pounds 000 0.7 305 1,005 8000 8000 16,2 100°0 or more Last Meather Westernation (Speed Report No. Date No previous study Present 7.66 Less than 5000 pounds 1.8 11.07 31.2 58.8 000 14.7 7000 100.0 PRUCKS Last Present 6.30 51.0 0.0 10 15.9 75.7 90.56 10000 0.5 40.02 94.03 F Last Date Time Present 6.17 0.0 9.65 0.5 70.3 94.8 56.7 2.9 17:09 40.5 100° LUCO.0 Non-Indiana Location Last PASSENGER CARS Present 69.2 8666 15.7 39.5 60.5 2,5 95.6 10°00' 7000 6.95 0.0 1.5 6.5 1619 70C Indiana Last This Observation Surface Present 7.25 0,26 0.04 0.66 000 8.4 19.8 37.00 0.96 5.66 57.03 1.1 65,1 87.9 6.66 2637 F Last Highway Time Date Average speed (m.p.h. No. of vehicles obs. Standard deviation 79 m.p.h. Station 1 thru 12 49 m.p.h. 54 m.p.h. 59 m.p.h. 64 m.p.h. 69 ш.р.h. 74 m.p.h. 84 m.p.h. 89 mepehe 24 m.p.h. 29 m.p.h. 34 m.p.h. 39 m.p.h. 44 m.p.h. OBSERVATION No. of Lanes than Tess JO traveling % of vehicles All vehicles

obs.

of vehicles

No

Boun

No. of vehicles obs.

Average speed

pumog

Average speed

-



TABLE 17

SUMMARY OF SPOT SPEED OBSERVATION ON INDIANA HIGHWAYS

(Free-Moving Vehicles on Level, Tangent Sections)

				Passenge				Trucks	2
the year and the same of the s				Non-Ind.		All	Light	Heavy	All
ATT.	and the same of th		M2811	Herm	Moan	Ge var	Mean	Man	1. 22
Two-Lone High	ADIATI							Call	C. C. C. Co., Str. Co., St
	lay lug. sug. lar. sug. lar. lay. lay.	61 61	55.6 55.5 54.3 55.5 55.6 53.3 55.7 56.7 56.2	59.1 56.7 56.3 57.7 55.3 54.8 55.6 56.4 55.7	56.9 55.9 55.0 56.1 55.9 53.7 55.6 56.6 55.9	64.0 62.1 61.7 61.9 63.2 61.2 62.0 63.9	50.2 51.7 53.0 50.4 49.7 48.5 53.0 53.7 50.4	44.8 45.8 46.3 45.4 46.7 45.9 48.1 47.5 48.9	46.1 47.8 47.8 46.3 48.0 46.6 49.1 49.3
	weys by a.c.	157	59.9	63.6	61.0	69.0	52.2	46.0	47.9
A 3-3	ier.	157 158 159 159	57.5 58.0 58.2 58.4	59.9 59.6 61.7 60.1	58.5 58.7 59.0 59.1	64.8 65.0 64.9 64.5	52.0 54.3 53.6	46.6 49.0 47.0	47.6 50.0 48.4
M S M	ept.	160 161 161	50.1 59.5 58.9	59.2 60.2 61.0 57.6	59.7 59.6 57.6	65.8 66.7 63.5	50.0 52.4 54.8 54.0 53.6	53.1 57.3 51.3 47.3 50.3	49.5 18.4 52.0 48.9 51.0
Interstate Hig	hway	S		TO ACCOMING MANAGEMENT AND THE SEC. OF	Maria Waller on .) <u></u>
	ug.	'61	56.7*	56.9*	58.2	64.0	55.9	51.5	52.4
All Highways			The same of the sa	THE PROPERTY OF THE PARTY OF TH	and it is placed becoming the ball of the second		agent Black Breek y of govern your room		MARIE PROPERTY.
An An Mi An Mi Se Ms	ay ug. ug. ug. er. ug. er.	57 58 59 59 60 60	57.2 56.2 55.7 56.6 56.5 55.6 57.3 57.7 56.9	60.3 58.3 57.9 59.0 58.4 57.1 57.6 58.3	58.3 56.9 56.5 57.4 56.0 57.4 57.9	66.0 63.2 63.1 63.5 63.0 63.7 65.1 63.4	50.9 51.8 53.4 51.5 50.6 50.2 53.7 53.8 53.1	45.2 45.1 47.5 45.9 47.8 46.6 49.4 47.4 50.3	46.6 47.4 48.7 47.0 48.6 47.5 50.2 49.1 51.0

^{*}Includes data for only three of the four stations on Interstate Highways



Table 18. Analysis of Variance

Source	Degrees of	Sum of Squares	Mean Square	Fwvalue
Highway Type	2	4277	2138	46.5
Stations (in highway type)	9	8982	998	217
Vehicle type	2	25028	12512	272.0
Highway by Vehicle interaction	14.	1396	349	7.6
Error	3690 3707	168969 208652	46	

^{*}An F value above 5.30 (2 and infinite degree of freedom) indicates significance at the 99.5% confidence level.

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